

REMARKS

Please consider the application in view of the following remarks.

Status of Claims

Claims 1-9 are pending in the present application. Claim 7 is withdrawn from consideration.

Claim Rejections - 35 U.S.C. §102

The Examiner has rejected claims 1 and 4 under 35 U.S.C. 102(e) as being anticipated by **Kuramoto et al** (2004/0081565).

Applicants respectfully traversing this rejection.

Independent Claim 1

The law regarding anticipation under 35 U.S.C. §102 is clear. Anticipation requires the presence in a single prior art reference disclosure of each and every element of the claimed invention, arranged as in the claim.

The Kuramoto reference clearly does not disclose the following elements and limitations in claim 1:

.... a booster pump connected to a vacuum chamber, said booster pump having a pair of multistage Roots-type pump rotors

On page 6, item 18, under the Response to Arguments heading, the Examiner continues to insist that, under his broad interpretation, the booster pump 61 disclosed in Kuramoto reads on the booster pump as recited in claim 1, i.e., the booster pump having a pair of multistage Roots-type pump rotors.

However, the broader construction proffered by the Examiner is utterly without merit in light of the fact that the Kuramoto reference explicitly teaches that the booster pump 61 is a single stage root pump, which performs gas discharging in a single stage (see paragraph [0029]). That is, in view of the explicit teaching of Kuramoto, the evidence is undisputed that pump 61 is a single stage root pump and NOT a multistage root pump.

Because Kuramoto does not disclose each and every element and limitation recited in claim 1, Applicants submit that Kuramoto does not anticipate claims 1 and 4 as argued by the Examiner. As such, Applicants request that the Examiner withdraw this improperly advanced rejection.

Claim Rejections - 35 U.S.C. §103

The Examiner has also rejected claims 1, 4 under 35 U.S.C. 103(a) as being unpatentable over **Kuramoto** in further view of **Hall et al** (6,708,981).

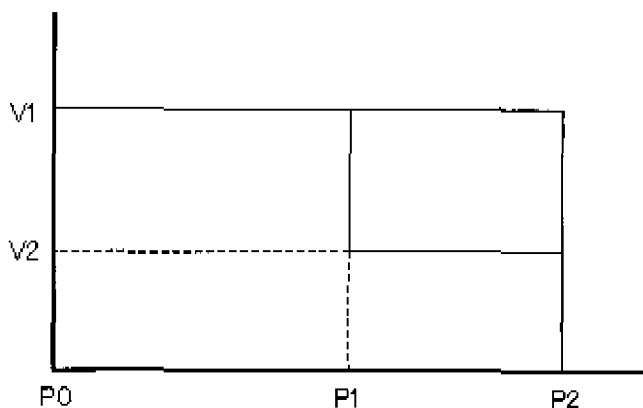
On page 3, item 8 of the Office Action, the Examiner contends that Hall, in column 3, lines 49-58, discloses “that the booster pump could be multi-stage. This would allow Kuramoto to have its booster pump be multi-stage just as its main pump is multi-stage in order to have efficient pumping and/or higher capacity out of the booster. Therefore, it would have been obvious to one having ordinary skill in the art at the time of the invention to form the booster pump multi-stage just as the main pump because as taught by Hall using a multi-stage booster can also create advantages (see above) for the pumping apparatus.”

Applicants do not agree with the Examiner. Applicants submit that the new obviousness rejection advanced by the Examiner is improper because of a teaching away. That is, modifying the Kuramoto reference in the manner proposed by the Examiner would render the Kuramoto reference unsatisfactory for its intended purpose. This is because Kuramoto explicitly teaches using a multi-stage root pump as the main pump 11 because in order to efficiently increase the temperature in the booster pump 61 by using the heat generated in the main pump 11, it is necessary to transmit the heat at the high-temperature portion of the cylinder block 15 of the main pump 11 to the cylinder block 15 of the booster pump 61 (see paragraph [0037] of Kuramoto reference).

If the Kuramoto reference is modified as suggested by the Examiner, it would destroy the feature of effectively raising the temperature in the booster pump (see paragraphs [0005] and

[0006] of Kuramoto). The object of the invention in the Kuramoto reference is to raise the temperature of the booster pump in order to prevent deposition of reaction product in the booster pump, as described in paragraph [0002]. If the booster pump having a single-stage root rotor is modified into a two-stage root type pump, the temperature thereof would drop.

The following graph shows a difference in heat generation between a single-stage booster pump and a two-stage booster pump.



A quantity of heat generated in the single-stage booster pump Q1 is given by

$$Q1 = V1 \times (P2 - P0)$$

where V1 is pumping speed (volume per unit time) of the single-stage booster pump, P0 is suction-side pressure of the booster pump, and P2 is suction-side pressure of a main pump.

On the other hand, a quantity of heat generated in the two-stage booster pump Q2 is given by

$$Q2 = V1 \times (P1 - P0) + V2 \times (P2 - P1)$$

where V1 is pumping speed (volume per unit time) of a first-stage rotor of the two-stage booster pump, V2 is pumping speed of a second-stage rotor of the two-stage booster pump, P0 is suction-side pressure of the two-stage booster pump, P1 is discharge pressure of the first-stage rotor of the two-stage booster pump, and P2 is suction-side pressure of a main pump.

As can be seen from the above graph, Q2 is smaller than Q1 (i.e., $Q1 > Q2$). Consequently, using the two-stage booster pump instead of the single-stage booster pump will result in a lower temperature of the booster pump, thus causing the deposition of the reaction product.

Therefore, Applicants believe that the obviousness rejection raised by the Examiner is improper in the light of a teaching away. As such, Applicants submit that it would not have been obvious to one of ordinary skill in the art to modify the Kuramoto reference in the way suggested by the Examiner.

Dependent claims 2-6 and 8-9

Claims 2, 8-9 were rejected under 35 U.S.C. 103(a) as being unpatentable over **Kuramoto** or **Kuramoto/Hall** as discussed above, in view of either **Weatherston et al** (USP 3,667,874, hereinafter referred to as "Weatherston '874") or Weatherston (USP 3,922,117, hereinafter referred to as "Weatherston '117").

Claims 3-4 were rejected under 35 U.S.C. 103(a) as being unpatentable over **Kuramoto** or **Kuramoto/Hall** as discussed above, in view of either **Crinquette et al** (4,887,941) or **Morgan et al** (4,850,806).

Claim 5 was rejected under 35 U.S.C. 103(a) as being unpatentable over **Kuramoto** or **Kuramoto/Hall** as discussed above, in view of either Baubron (4,442,353) or **Becker** (5,584,669).

Claim 6 was rejected under 35 U.S.C. 103(a) as being unpatentable over **Kuramoto** or **Kuramoto/Hall** as discussed above, in view of **Miura et al** (6,056,510).

Applicants respectfully traverse these rejections because the dependent claims are patentable by virtue of their dependency on claim 1, i.e., they incorporate by reference the distinguishing features of claim 1.

Conclusion

The Claims have been shown to be allowable over the prior art. Applicants believe that this paper is responsive to each and every ground of rejection cited in the Office Action dated December 21, 2010, and respectfully request favorable action in this application. The Examiner is invited to telephone the undersigned, applicants' attorney of record, to facilitate advancement of the present application.

Application No. 10/563,255
Art Unit: 3746

Amendment under 37 C.F.R. §1.111
Attorney Docket No. 053549

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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